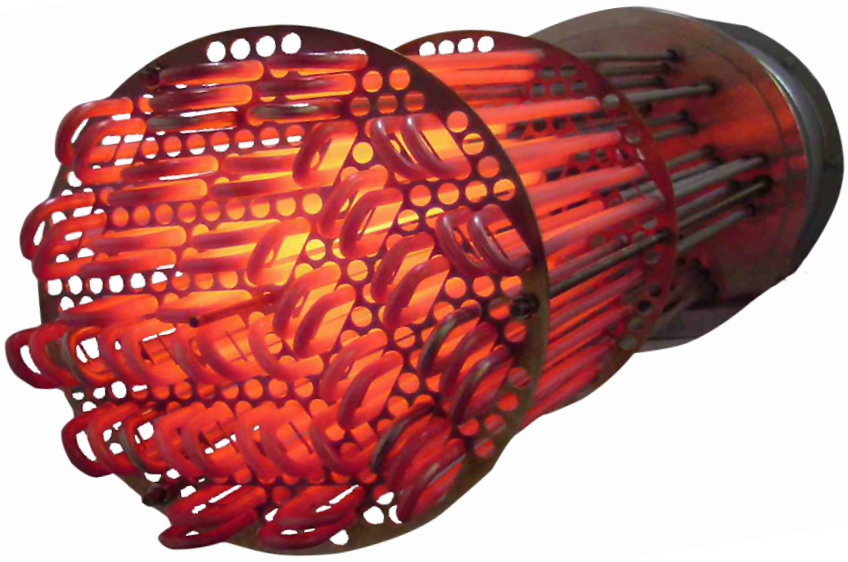
Specification Sheet

Flanged Immersion Heater

Ideal for Heating Liquids, Gases, Tanks and Pressure Vessels Requiring Higher Kilowatts

Flanged Immersion Heaters consist of hairpin bent tubular elements welded or brazed into a flange and provided with wiring boxes for electrical connections. Flanged heaters are installed by bolting to a matching flange welded to the tank wall or nozzle. A wide selection of flange sizes, kilowatt ratings, voltages, terminal enclosures and sheath material make these heaters ideal for all type of heating applications.



Flanged Immersion Heater operating under dry heat condition

Applications

Flanged immersion heaters are one of the most widely used methods for heating gases and liquids (such as water, oil, heat transfer fluid and corrosive solutions). Designed for use in tanks and pressurized vessels, they are easy to install and maintain to provide heat for many processes. The direct immersion method is energy efficient and easily monitored and controlled.

- Hot Water Storage Tanks
- Warming Equipment
- Preheating All Grades of Oil
- Food Processing Equipment
- Cleaning and Rinsing Tanks
- Heat Transfer Systems
- Process Air Equipment
- Boiler Equipment
- Freeze Protection of Any Fluid

Service Industries

- Petrochemicals
- Chemical Industry
- Food Industry
- Plastics
- Aeronautics
- Etc.

Temperature Control

Temperature sensors (thermostat, limiter, thermocouple or PT 100) in the medium (process control) or on the heating element (safety control), on the flange or in the enclosure.

Advantages

- Large range of materials and options according to customer process and conditions of use
- Equipment available for use in hazardous area or safe environment
- The end-to-end control of the design and production chain allows us to deliver a product which suits your process perfectly.

VEMA flanged immersion heaters are designed and manufactured according to customer specifications. Reliability and robustness are key drivers for our engineers.

VEMA Heating Elements

1. Connection Terminals
2. Tube
3. Insulation: Magnesium Oxide (MgO), to secure optimized heat transfer and electrical insulation.
4. Resistance Wire: Made of Ni80Cr20, it is the active part of the heating element.
5. Cold Length
6. Sealing Material: Keeps out external moisture. Different types (silicone, epoxies, cement) are used depending on the industrial application, the external temperature and medium.
7. Output Insulation: Made of steatite ceramic, it provides dielectric insulation (creepage distance).

PMJ manufactures its own heating elements which are the key components (active parts) of all electric heating systems. The design is defined according to customer specifications.

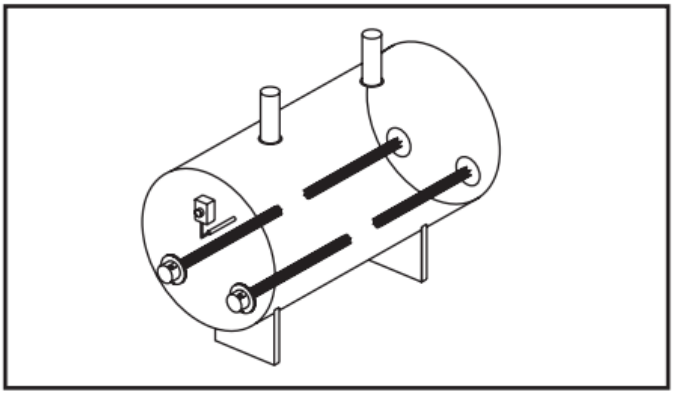
The watt density, tube diameter and the tube sheath material are chosen to optimize the reliability and robustness (corrosion, temperature) of VEMA equipments.

Manufacturing

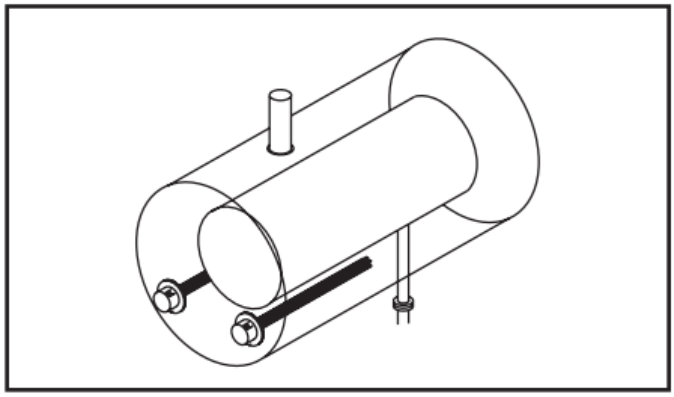
The electric heating resistance (sheathed heating resistance) consists of a Ni80Cr20 resistance wire in the middle of a protective tube. It is then filled with high quality MgO powder enabling an optimized heat transfer and electrical insulation,

Each side of the heating element has a cold length which is used for wiring; its length depends on the application.

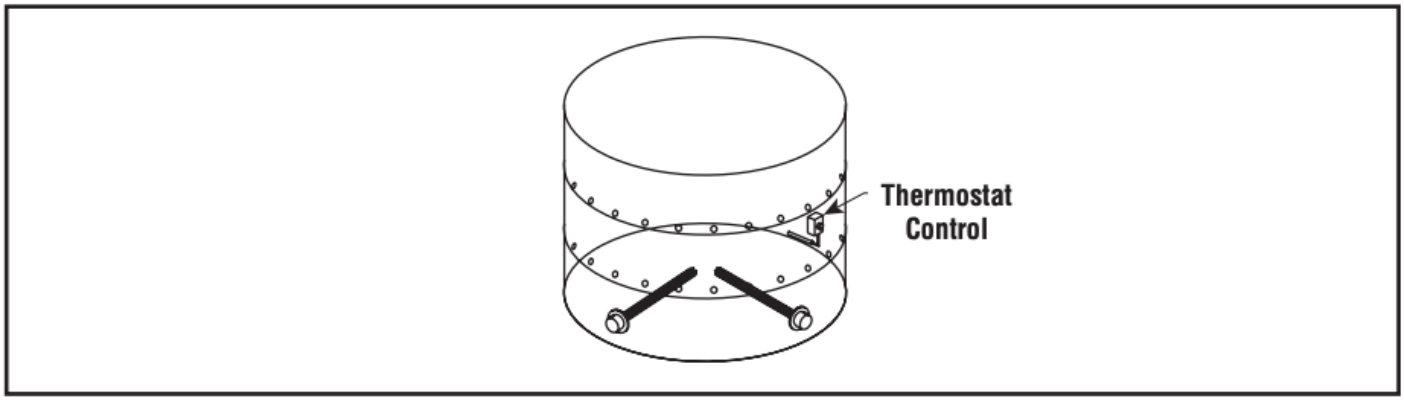
Typical Applications



Flanged heaters mounted on each end of hot water storage tank or for an efficient shower system.



Flanged heaters in tank of water to heat inner tank of viscous materials.



Flanged heaters mounted angularly around tank bottom permitting free vertical work area.

Selection Guidelines

The selection of the proper Flanged Immersion Heater requires critical engineering judgement. After determining the heat requirement (see the applications section of this catalog), the proper selection of the flange material, heating element sheath material and correct watt density is critical for long life of a heater. The following table may be used as a guide to this selection along with the Technical Information at the back of this catalog. Ultimate choice is determined by the knowledge of the process and engineering acumen of the plant engineer.

Heater application is influenced by the following parameters.

1. The heated medium viscosity, specific heat density and corrosive properties.
2. Contaminants present in the medium.
3. The heater sheath material corrosion resistant properties.
4. Watt density of the heating element — the heat output per square inch.
5. Maximum sheath temperature — this is the recommended maximum sheath temperature of the element material. It is not the operating temperature of the heated medium (sheath temperature is dependent on items 1 thru 4).

Application Selection - Guidelines

	①	②	③	④	⑤
Application	**Solution or Heater Type**	**Alkaline or Acid Content (Est. % by Volume)**	**Sheath Material**	**Watt Density (W/In^2)**	**Max. Recommended Sheath Temp. (°F)**
Water & Very Mild Solutions	Clean Water	pH6 to pH8 Neutral	Copper	45	350
	Process Water Very Weak solutions	pH5 to pH9 2 - 3%	Stainless Steel[1]	45	1200
	Weak Solutions	5 - 6%	INCOLOY®	45	1600
	Demineralized, De-ionized or pure water	—	INCOLOY® w/ Stainless Flange	45	1600
Corrosive & High Viscous Solutions	Mild Corrosive Solution	5 - 15%	Stainless Steel[1]	23	1200
	More Severe Corrosive Solution	10 - 25%	INCOLOY®	23	1200
	Severe Corrosive Solution	30 - 60%	INCOLOY® w/ Stainless Flange	15	1600
Specialty Water	Steam Boilers	Treated	INCOLOY®, Copper	—	1600
Oil	Low Viscosity Oil Medium Viscosity Oil High Viscosity Oil	— — —	Steel Steel Steel	23 15 6.5	750 750 750
Oil Reservoir	Lubrication Oil	—	Steel	15	750
Air, Gases & Steam	Low Temperature		Stainless Steel	23	1200
	High Temperature		INCOLOY®	23	1600

1. Passivated stainless steel recommended for water.

Corrosion Policy

PMJ cannot warrant any electric immersion heater against failure by sheath corrosion if such failure is the result of operating conditions beyond the control of the heater manufacturer. It is the responsibility of the purchaser to make the ultimate choice of sheath material based on their knowledge of the chemical composition of materials entering the solution, and controls which he maintains on the process.

Caution

Low water levels in the boiler or excessive scale build-up on the heating elements cause most boiler heater failures and both have to be taken into account should several heaters fail simultaneously.

It is recommended to contact a water treatment specialist in your area to examine or clean your system before installing any replacement parts.

Tube Materials

- Stainless Steel
  - SS 304 (Welded)
  - SS 321 (Welded)
  - SS 316L (Welded / Seamless)

- Nickel based Alloy
  - Incoloy 840 (Welded)
  - Incoloy 800 (Welded)
  - Inconel 600 (Welded)

  *Seamless Incoloy material available for EX proof heater

- Others
  - Titanium
  - Teflon Sheath (Milky White)
  - Teflon Coated (Dark Brown/ Black)

Tube Diameter

- ø 6.7 / 8.2 / 11.3 / 12.5 / 14.0 / 16.0 mm

Maximum U Length

- ø 6.7 (3 meters)
- ø 8.2 / 11.3 (3.5 meters)
- ø 12.5 (4 meters)
- ø 14.0 / 16.0 mm (3.5 meters)

Flange

- All diameters (including very large sizes)
- NF EN 1092-1 (European standard, PN)
- NF EN 1759-1 (European standard, Class)
- ASME B16-5 (American Standard)
- JIS (Japan Standard)
- Other standards on request
- Material choice according to application and standards (carbon steel, stainless steel or others)

Mounting

- Vertical
  - Need to specify liquid level for cold zone allocation

- Horizontal
  - Excessive horizontal length may need tube support to prevent tube bending

Filling Machine

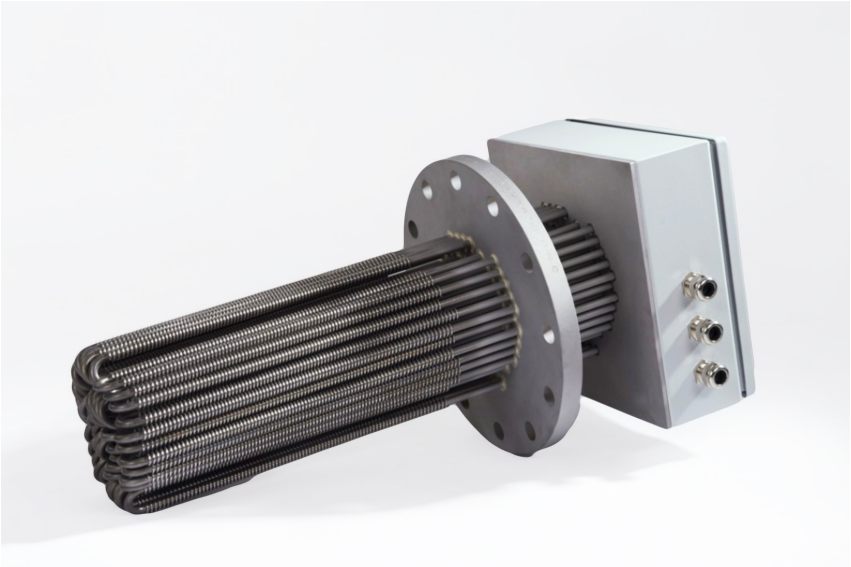
Electrical

- Voltage: VAC
- 1PH +N or 3PH
- Power: a few watt to several Megawatts

Enclosure

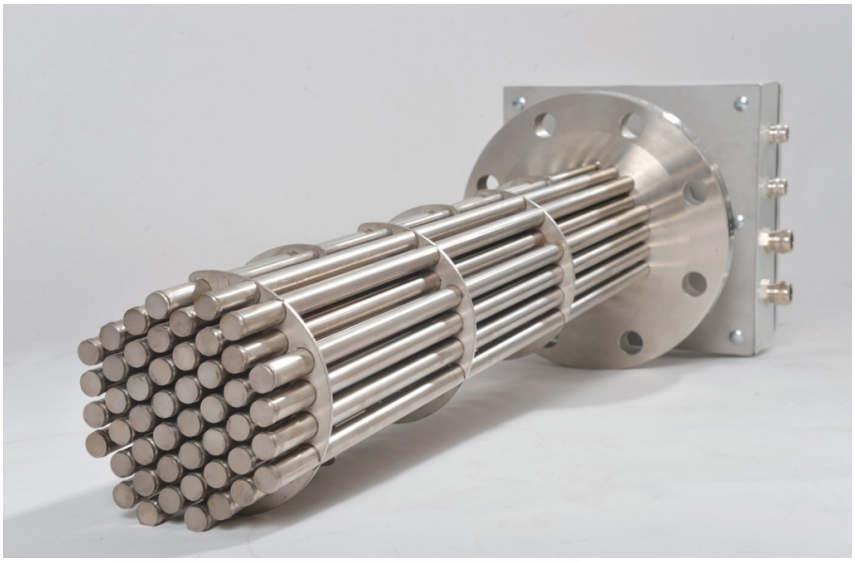
- IP54 / IP65 / IP66
- Material: Epoxy Coated Steel, Stainless Steel
- Polyamide, Nickel Plated Brass , Stainless Steel Cable Gland

Optional Style



Heat Dissipation Spring

- Reduce heat being accumulated on heater surface, eventually longer heater life
- Suitable for compacted, high kilowatt steam boiler heater unit



Cartridge

- To accommodate more kilowatts in limited flange size
- Suitable for water heating only

Drywell

- Low Density
- Suitable for water, oil, fatty acid, asphalt heating
- Easily replaceable heating elements, without the need to dismantle the whole heater unit; or drain the tank